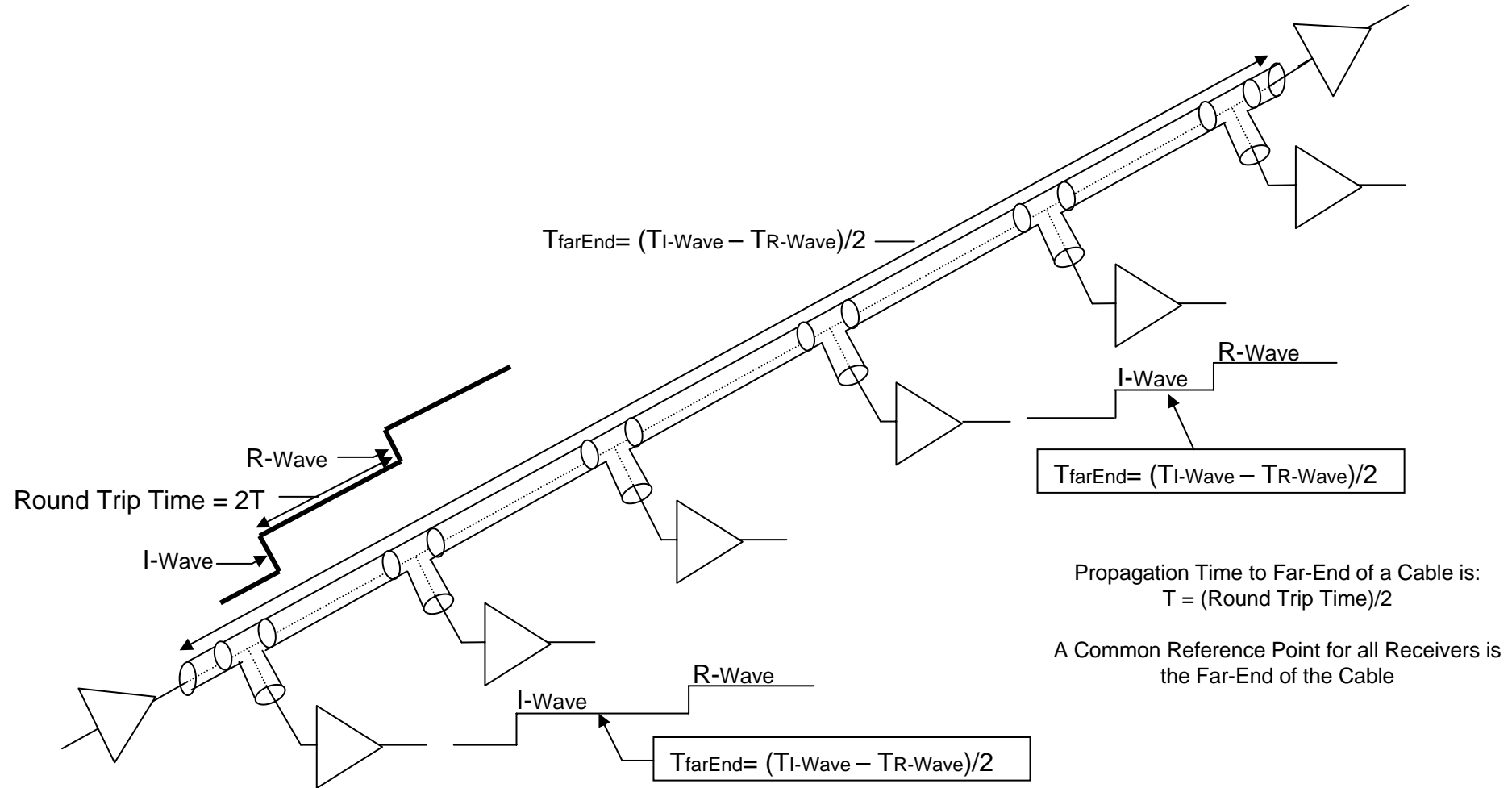# NOvA WorkShop
Discussion On Timing System

- ## Nova Timing System Thoughts

  – Based on CKM timing requirements

- ## NOvA DAQ Timing Requirements

  – Group discussion
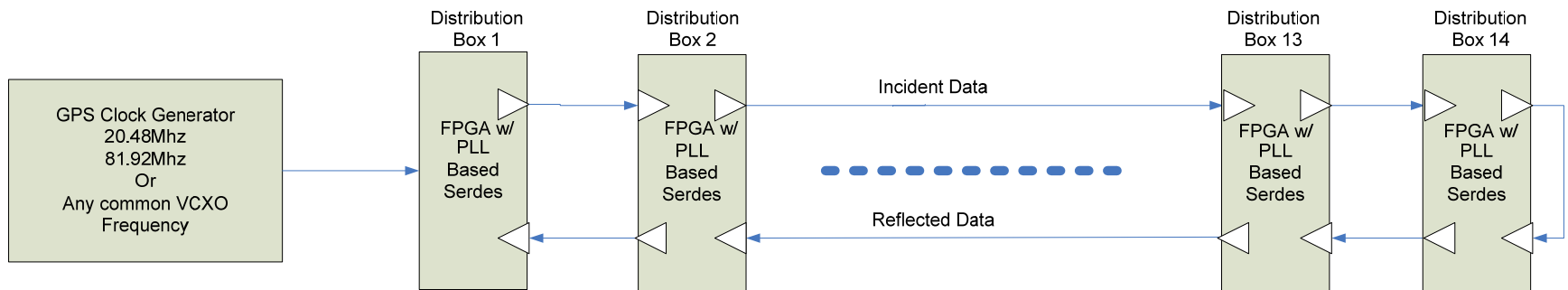
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$T_{farEnd} = (T_{I-Wave} - T_{R-Wave})/2$

R-Wave

Round Trip Time = 2T

I-Wave

R-Wave

I-Wave

$T_{farEnd} = (T_{I-Wave} - T_{R-Wave})/2$

Propagation Time to Far-End of a Cable is:
T = (Round Trip Time)/2

A Common Reference Point for all Receivers is
the Far-End of the Cable

R-Wave

I-Wave

$T_{farEnd} = (T_{I-Wave} - T_{R-Wave})/2$

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NOvA Global Timing Distribution

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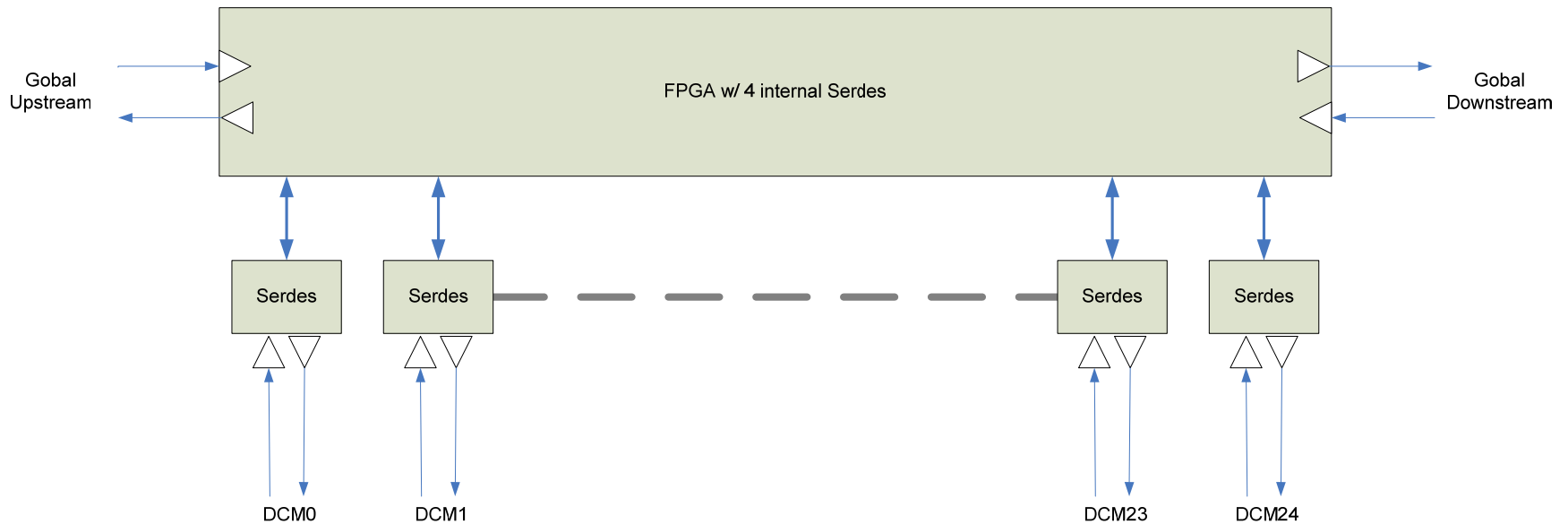# NOvA WorkShop
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NOvA Local Timing to DCMs

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GT10
GPS Synchronous
Clock Generator

CONNOR
WINFIELD
HCW

2111 Comprehensive Drive
Aurora, Illinois 60505
Phone: 630-851-4722
Fax: 630-851-5040
www.conwin.com

Features
- Phase locked 2.048MHz output
- Two selectable references: GPS or External 10MHz
- Freerun
- Two alarm outputs
- Serial input port and output port (GPS receiver)
- Master reset (GPS receiver)
- Battery backup (GPS receiver)
- +3.3 Volt power supply
- Commercial Temp (0-70° C)
- Meets ETSI-PRC Wander Mask

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General Description

The GT10 module is a GPS driven, mixed-signal phase lock loop, generating a 2.048MHz CMOS output from an intrinsically low jitter voltage controlled crystal oscillator.

The GT10 can lock to a 10MHz reference derived from the on-board GPS receiver or to an external 10MHz reference. Alarms are provided to indicate Loss-of-Reference, Loss-of-Satellite, Loss-of-Lock, and Freerun.

The on-board GPS receiver requires an outdoor mounted GPS antenna for the best stability and consistent performance. The unit is supplied with a 6.5" coaxial antenna cable (Hirose CASS-0460) connected directly to the GPS receiver. The user end of the cable is an SMA female bulkhead.

The GT10 supports manual operation only. The mode control inputs are used to manually switch between references and/or freerun. The user application should monitor the alarm outputs and manually switch modes as needed.

Serial I/O lines provide access to the NMEA messages from the GPS receiver (refer to the Connor-Winfield CW25 User Manual). The serial I/O lines can be used to access GPS timestamp information, or to verify that the receiver has recovered from an alarm condition.

The battery backup to the GPS receiver is required if a full cold start needs to be avoided. Without a battery backup, the stored position, time, and satellite ephemeris will be lost and a cold start will be required to reacquire this information.

The master reset is used to reset the GPS receiver (if needed).

Functional Block Diagram

Figure 1
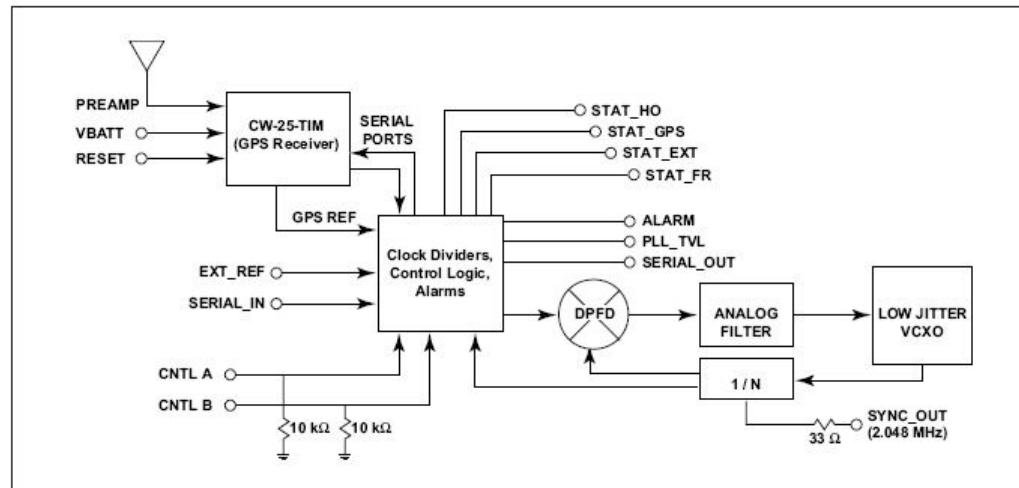
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Figure 1. TLK1501 Block Diagram

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- ## What are the timing requirements?

  - Resolution

  - Accuracy

- ## What make's up the TimeStamp?

  - Realtime clock plus added bits for resolution

  - Free running synchronized clock counter

- ## Where's the TimeStamp created?

  - Highest level of timing system

  - Frontend electronics

- ## What is the expected Schedule for the timing system?

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